

Identification of Molybdenum-Reducing Psychrotolerant Marine Bacteria Isolated from Bernardo O'Higgins Riquelme Base Station, Antarctica

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Molybdenum (Mo) is an abundant heavy metal element that exists in the earth. However, numerous industrial applications have caused its unrestrained discharge to the environment. This anthropogenic activity is the main source of Mo leaching and contaminating underground water as well as the marine environment. In recent decade, traces of Mo have been found in soil, lakes and snow of the Antarctic, which could bring negative effects to the ecosystem. Bioremediation using bacteria is an effective process to transform heavy metal contaminants into their less toxic form. Reduction of Mo is an enzymatic process transforming molybdate with an oxidation state of 5+ or 6+ to Mo-blue, a less toxic, stable colloid that can be filtered out from the environment. The objectives of this study are to identify and screen the best psychrotolerant Mo-reducing bacterial strain isolated from marine water samples at Bernardo O'Higgins Riquelme Base Station, Antarctica. A total of 11 strains were observed possessing the ability reduce Mo. Further study was conducted to determine their taxonomic position by constructing phylogenetic tree. Bacterial identification using 16S rRNA revealed that the strains were under genus *Shewanella*, *Staphylococcus* and *Marinomonas*. Screening test conducted by subjecting 11 pure strains to Mo proved that *Marinomonas* sp. strain AQ5-A9 has the best Mo reduction ability with the highest blue intensity after nine days of incubation. This study proposes the possible use of native psychrotolerant Mo-reducing bacteria, strain AQ5-A9, on remediating of Mo in the Antarctic region.

References

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